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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Arpan P. Mahorowala et al.

Serial No.: 09/902,727

Art Unit: 2822

Filed: July 12, 2001

Examiner: Novacek, Christy L

For: Lateral-Only Photoresist
Trimming for Sub-80 nm Gate
Stack Definition.Atty Docket: YOR9200000064US1
(20140/0268)**DECLARATION UNDER 37 CFR § 1.131**Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Arpan P. Mahorowala a co-inventor of the invention defined in U.S. patent application 09/902,727 hereby declare that:

I have reviewed and understand the contents of the Advisory Action dated 06/25/2004.

I understand that the Examiner has rejected claims 1-8, 12-13, 17-18, and 22-30 under 35 U.S.C. § 103(a) as being anticipated by Pike et al. (US 6,420,097) ("Pike").

Pike was filed May 2, 2000.

I declare that the present invention was conceived and reduced to practice prior to the filing of the Pike reference.

Evidentiary support for conception and diligence prior to the Pike filing is provided in the application as filed. Figure 4 of the application comprises two electron micrographs. Each electron micrograph is provided indicia emplaced by the automatic

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camera system used to take the pictures. The micrograph of Figure 4A is dated 10-Jan-00 (January 10, 2000). The micrograph of Figure 4B is dated 23-Dec-99 (December 23, 1999).

The specification, as originally filed, described Figure 4 in such manner that a person of skill would know that the inventor, at the time of taking the micrograph, had successfully reduced the invention to practice. Figure 4, as described in the specification, as filed, shows reduction to practice of the entire invention, as claimed. The Examiner's attention is directed to page 9 of the specification which demonstrates the successful testing of the entire invention, as claimed:

The last step of the process involves transferring of the developed image in the top layer 7, through the underlayer 6, and stopping on substrate 1 by known, oxygen-reactive ion etching techniques. Oxygen-reactive ion etching techniques are well known in the art and equipment to etch film is commercially available. The developed film has high aspect ratio, high etch resistance, enhanced resolution, and straight wall profiles.

Turning now to Figure 3, an embodiment of the present invention provides control over the extent to which the lateral trimming proceeds. The variation in CD with respect to etching time for isolated lines with two different widths is shown in Figure 3. The lines as photo-imaged were 185 nm (L-181) and 220 nm (L-182) before they were transferred into the underlayer. SEM micrographs of the unetched L-181 sample and 60% overetched L-181 sample are shown in Figure 4 where one can observe the drastic reduction in line-width. At the end of the etch (0% overetch), there is a CD loss which can be determined by extrapolating the dashed lines and subtracting this value from the as-imaged CD. As the patterns were overetched longer, an approximately linear decrease in CD was observed.

Figure 4 presents a successful test of the entire invention at a date prior to the publication of the Pike reference.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the

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like so made are punishable by fine or imprisonment or both under 18 U. S. C. § 1001
and that such willful false statements may jeopardize the validity of the application or any
patent issued thereon.

Arpan P. Mahorowala Arpan P Mahorowala, Date July 7, '04

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